

200310701-1

10/648,122

IN THE CLAIMS:

Please amend the claims as follows:

1. (previously presented) A method for creating a three-dimensional solid freeform fabrication object with non-reactive powder comprising:
 - spreading a non-reactive powder on a substrate;
 - selectively dispensing a reactive resin directly onto said non-reactive powder, forming a mixture of reactive resin and non-reactive powder, wherein said mixture defines said three-dimensional object; and
 - curing said reactive resin thereby encapsulating said non-reactive powder.
2. (previously presented) A method for creating a three-dimensional solid freeform fabrication object with non-reactive powder comprising:
 - spreading a non-reactive powder on a substrate;
 - heating a reactive resin to a temperature of about 40 to 200 degrees Celsius (C);
 - selectively dispensing said heated reactive resin onto said non-reactive powder, forming a mixture of reactive resin and non-reactive powder, wherein said mixture defines said three-dimensional object; and
 - curing said reactive resin thereby encapsulating said non-reactive powder.
3. (previously presented) A method for creating a three-dimensional solid freeform fabrication object with non-reactive powder comprising:
 - spreading a non-reactive powder on a substrate;
 - selectively dispensing a reactive resin onto said non-reactive powder, forming a mixture of reactive resin and non-reactive powder, wherein said mixture defines said three-dimensional object;
 - applying ultrasonic energy to said mixture of reactive resin and non-reactive powder;
 - and
 - curing said reactive resin thereby encapsulating said non-reactive powder.

200310701-1

10/648,122

4. (original) The method of claim 1, further comprising adding color to said reactive resin.

5. (original) The method of claim 1, wherein said reactive resin comprises a one-part reactive resin.

6. (original) The method of claim 5, wherein said one-part reactive resin comprises an ultraviolet (UV) curable resin.

7. (original) The method of claim 6, wherein said curing comprises applying UV radiation to said reactive resin.

8. (original) The method of claim 7, wherein said dispensing comprises selectively depositing a quantity of said one part reactive resin onto said non-reactive powder.

9. (original) The method of claim 1, wherein said reactive resin comprises a two-part reactive resin including a reactive build material and a curing agent.

10. (original) The method of claim 9, wherein said dispensing comprises: dispensing a layer of said reactive build material; and dispensing a layer of said curing agent.

11. (original) The method of claim 9, wherein said dispensing comprises simultaneously dispensing said reactive build material and said curing agent.

12. (original) The method of claim 9, wherein:
said reactive build material comprises an epoxy; and
said curing agent comprises a material from one of a amino group, a hydroxyl group, or a carboxyl group.

13. (original) The method of claim 9, wherein:
said reactive build material comprises a polyisocyanate; and

200310701-1

10/648,122

said curing agent comprises a polyol.

14. (original) The method of claim 9, wherein:
said reactive build material comprises a functionalized silicone; and
said curing agent is configured to react with a functional group on said silicone.

15. (original) The method of claim 9, wherein:
said reactive build material comprises prepolymers with unsaturated functionality; and
said curing agent comprises a free-radical cure curing agent.

16. (original) The method of claim 1, wherein said reactive resin comprises a two-part UV curable resin including a UV initiator and a build material.

17. (original) The method of claim 16, wherein said selectively dispensing comprises:
dispensing a layer of build material on said non-reactive powder; and
dispensing a layer of said UV initiator.

18. (original) The method of claim 16, wherein said selectively dispensing comprises simultaneously dispensing said build material and said UV initiator.

19. (original) The method of claim 16, wherein said UV initiator is dissolved in a solvent.

20. (original) The method of claim 19, wherein said solvent comprises a monofunctional monomer.

21. (original) The method of claim 16, wherein said build material comprises one of an acrylic compound, a compound having an epoxy substituent, a vinyl ether substituent, vinylcaprolactam, vinylpyrrolidone, or urethanes.

200310701-1

10/648,122

22. (original) The method of claim 16, wherein said UV initiator comprises one of a free radical initiator or a cationic initiator.

23. (original) The method of claim 1, wherein said non-reactive powder comprises one of silica particles, glass spheres, metal powders, polymer powders, ceramic powders, or magnetic powders.

24. (currently amended) A solid freeform fabrication system for producing a three-dimensional object using non-reactive powder comprising:

a powder spreading system configured to spread a specified quantity of non-reactive powder to form a layer of said powder on a substrate;

a dispensing system adapted to selectively dispense both components of a two-part reactive resin onto said layer of non-reactive powder; and

a computing device coupled to and configured to control said dispensing system and said curing powder spreading system.

25. (original) The solid freeform fabrication system of claim 24, wherein said powder spreading system comprises a mechanical roller.

26. (original) The solid freeform fabrication system of claim 25, wherein said mechanical roller is configured to planarize and pack a quantity of said non-reactive powder.

27. (original) The solid freeform fabrication system of claim 24, wherein said dispensing system comprises an inkjet dispenser.

28. (original) The solid freeform fabrication system of claim 27, wherein said inkjet dispenser comprises one of a thermal inkjet dispenser, a continuous inkjet dispenser, or a piezoelectric inkjet dispenser.

29. (previously presented) The solid freeform fabrication system of claim 27, wherein said inkjet dispenser comprises a plurality of ejection orifices configured to selectively eject both components of said two-part reactive resin.

200310701-1

10/648,122

30. (previously presented) A solid freeform fabrication system for producing a three-dimensional object using non-reactive powder comprising:

- spreading means for spreading successive layers of said non-reactive powder;
- dispensing means for dispensing a reactive resin onto said non-reactive powder;
- curing means for curing said reactive resin, wherein said curing means only partially cures a layer of reactive resin until at least one additional layer of non-reactive powder and selectively-dispensed reactive resin have been formed, said reactive resin then being fully cured so as to promote adhesion between layers of said object; and
- controlling means for controlling said spreading means, said dispensing means, and said curing means.

31. (original) The solid freeform fabrication system of claim 30, wherein said spreading means comprises one of a blade or a mechanical roller.

32. (original) The solid freeform fabrication system of claim 30, wherein said dispensing means comprises a thermal inkjet dispenser.

33. (original) The solid freeform fabrication system of claim 30, wherein said dispensing means comprises one of a piezoelectric inkjet dispenser or a continuous inkjet dispenser.

34. (original) The solid freeform fabrication system of claim 30, wherein said curing means comprises a heater.

35. (original) The solid freeform fabrication system of claim 30, wherein said curing means comprises a UV radiation applicator.

36. (original) The solid freeform fabrication system of claim 30, wherein said controlling means comprises a computer.

37-49. (cancelled)

200310701-1

10/648,122

50. (previously presented) The method of claim 2, wherein said reactive resin comprises an ultraviolet (UV) curable resin.

51. (previously presented) The method of claim 2, further comprising dispensing said heated reactive resin directly onto said non-reactive powder on said substrate.

52. (previously presented) The method of claim 2, further comprising applying ultrasonic energy to said mixture of reactive resin and non-reactive powder.

53. (previously presented) The method of claim 2, wherein curing said reactive resin further comprises:

partially curing said reactive resin;

applying at least one other layer of non-reactive powder and selectively dispensed reactive resin; and

fully curing said reactive resin after said at least one other layer is formed to promote adhesion between layers of said object.

54. (previously presented) The method of claim 3, wherein said reactive resin comprises an ultraviolet (UV) curable resin.

55. (previously presented) The method of claim 3, further comprising dispensing said heated reactive resin directly onto said non-reactive powder on said substrate.

56. (previously presented) The method of claim 3, wherein curing said reactive resin further comprises:

partially curing said reactive resin;

applying at least one other layer of non-reactive powder and selectively-dispensed reactive resin; and

fully curing said reactive resin after said at least one other layer is formed to promote adhesion between layers of said object.

200310701-1

10/648,122

57. (previously presented) The solid freeform fabrication system of claim 24, further comprising a curing system for curing said two-part reactive resin.

58. (previously presented) A method for creating a three-dimensional solid freeform fabrication object with non-reactive powder comprising:

- spreading a non-reactive powder on a substrate;
- selectively dispensing a reactive resin onto said non-reactive powder, forming a mixture of reactive resin and non-reactive powder, wherein said mixture defines said three-dimensional object;
- partially curing said reactive resin;
- applying at least one other layer of non-reactive powder and selectively-dispensed reactive resin; and
- fully curing said reactive resin after said at least one other layer is formed to promote adhesion between layers of said object.

59. (previously presented) A method for creating a three-dimensional solid freeform fabrication object with non-reactive powder comprising:

- spreading a non-reactive powder on a substrate; and
- selectively dispensing both components of a two-part reactive resin onto said non-reactive powder, forming a mixture of reactive resin and non-reactive powder, wherein said mixture defines said three-dimensional object.

60. (previously presented) The method of claim 59, further comprising curing said two-part resin.

61. (previously presented) The method of claim 59, further comprising allowing said components of said two-part reactive resin to react and harden said reactive resin.

62. (previously presented) A system for fabricating a three-dimensional solid freeform fabrication object with non-reactive powder comprising:

- a system for spreading a non-reactive powder on a substrate;

200310701-1

10/648,122

an inkjet dispenser for selectively dispensing a reactive resin onto said non-reactive powder, forming a mixture of reactive resin and non-reactive powder, wherein said mixture defines said three-dimensional object; and

a curing system for curing said reactive resin thereby encapsulating said non-reactive powder.

63. (previously presented) The system of claim 62, wherein said curing system comprises an ultraviolet light source.

64. (previously presented) The system of claim 62, further comprising a system for applying ultrasonic energy to said mixture prior to curing.

65. (new) The system of claim 24, further comprising a curing system for curing said reactive resin.